U.S. ARMY
ENTERPRISE SOLUTIONS
COMPETENCY CENTER

Business Intelligence Reference Guide

Introduction

Business Intelligence (BI) is a **management term**. It involves the application of certain technologies and data that provide managers and leaders with a way to link business strategy and execution, or business performance management. All of this is aimed at enabling well-informed and timely decisions.

The purpose of this reference guide is:

- To define the term Business Intelligence and present how it came to be.
- To provide a high-level overview of Business Intelligence.
- To provide factors and strategies that help to ensure a successful Army BI implementation.

The Enterprise Solution Competency Center (ESCC) has been established to provide the Army with an in-house capability to assist decision makers and functional domain leadership with the complex landscape of business transformation through supporting information technology.

Pre-Information Age (1960 – 1980)

- Limited computing resources available for analysis
- Data tracked and collected manually
- Information unavailable to support decision makers
- Business decisions based largely on intuition

Emergence of PCs and Relational Databases contributed to the shift from data processing to information technology

Evolution of Business Intelligence

Information Age (1980 – 2000)

- Start of automated data processing
- Silos of incompatible systems
- Common methods for describing data start to emerge (data modeling, data warehousing)
- Collection and analysis of information remains largely manual
- Delay between data availability and analysis

During this period, evolution of data warehousing enabled the creation of decision support systems (DSS) used to manage and control business

Business Intelligence Age (2000 – Current)

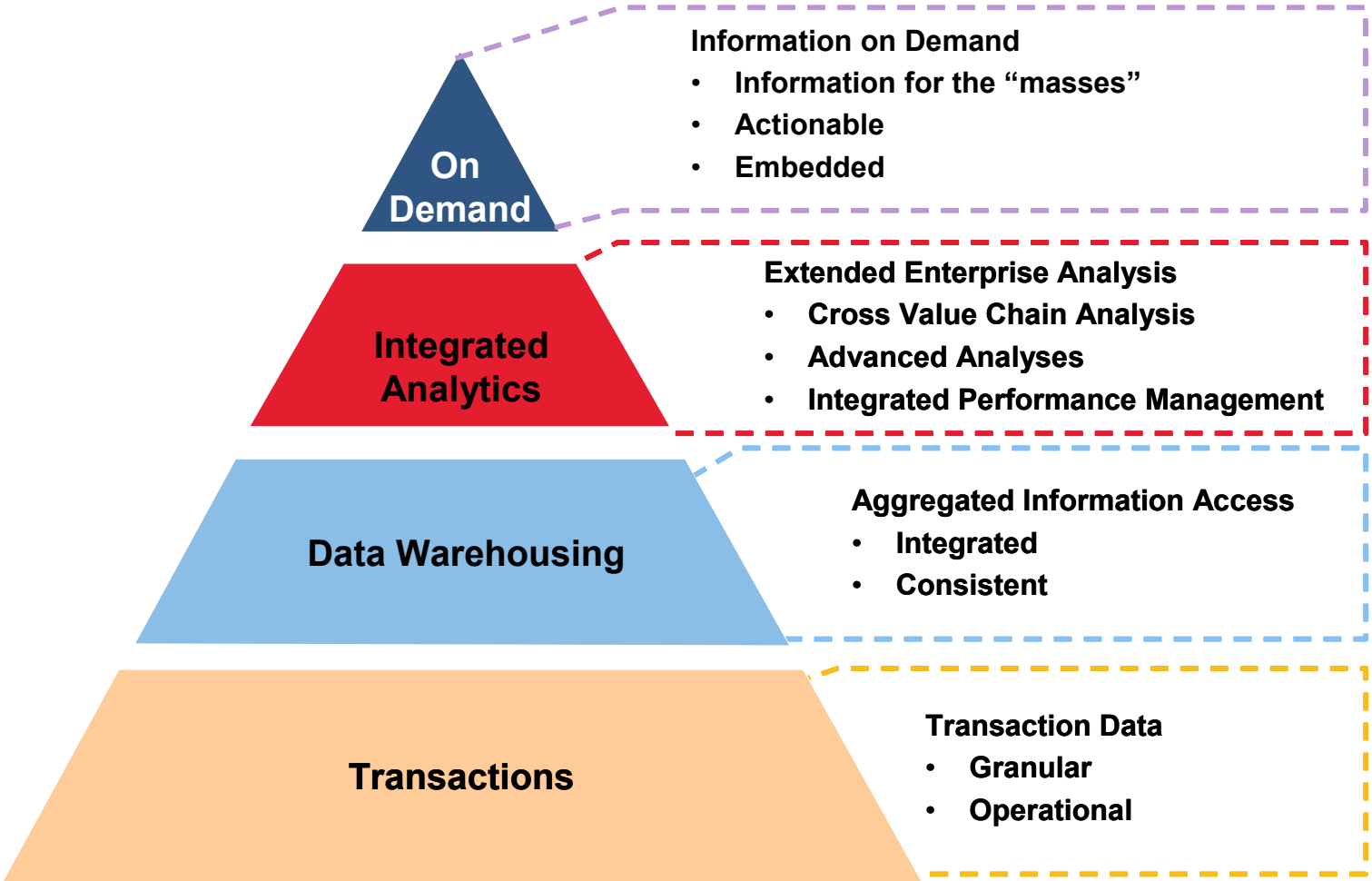
- Powerful and integrated computer systems enable large amounts of data to be combined, filtered, and reshaped on-the-fly
- Access to real-time information
- Personalization of information
- Information in a business context
- Event-driven information delivery
- Predictive analysis

Business Intelligence becomes a mainstream tool – enabling organizations to better understand and measure areas affecting its performance

What is Business Intelligence?

Business Intelligence is the process of gathering meaningful information that provides a positive impact on business. An integral part of Business Intelligence is ***Business Performance Management***. Performance Management is a continual process linking strategy and execution whose goal is to improve business effectiveness. In order to link strategy and execution together, high-quality and meaningful information about the business must be gathered and analyzed.

The following is a framework for developing business intelligence solutions that facilitate decision making necessary to identify and solve issues



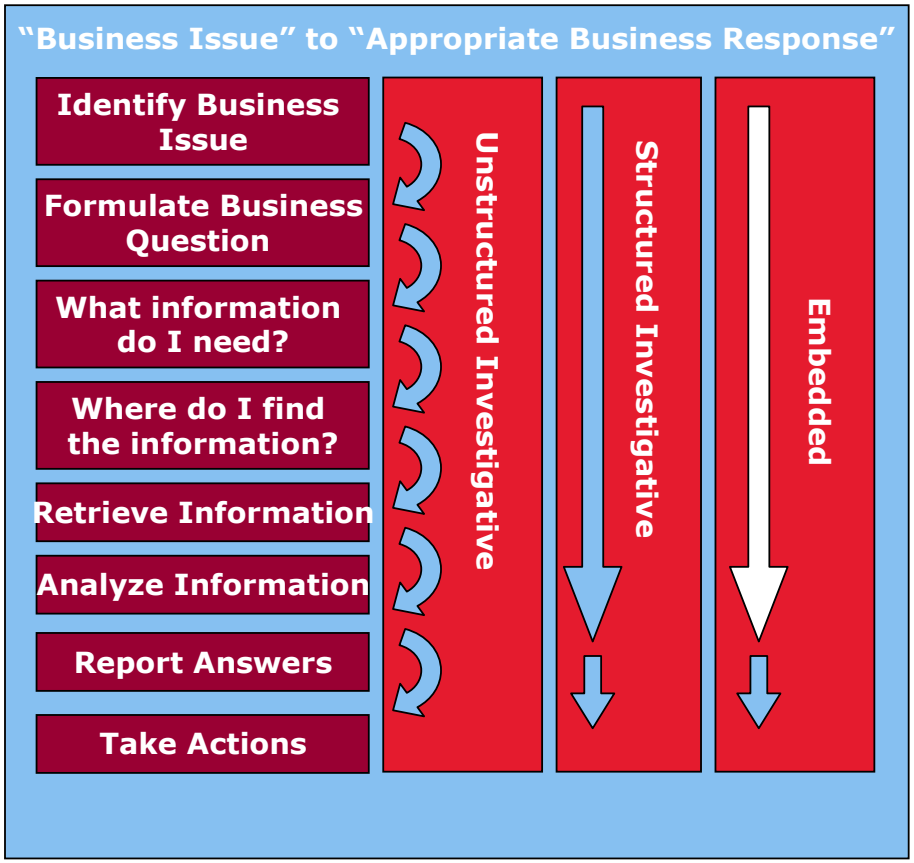
What is Business Intelligence?

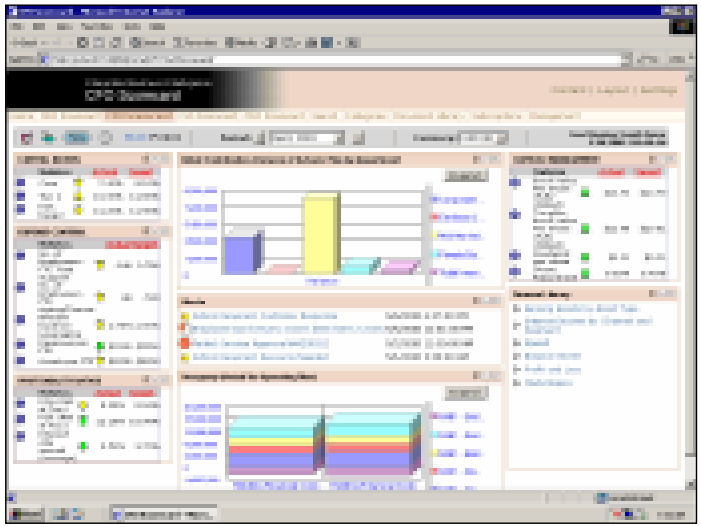
Business Intelligence Delivery

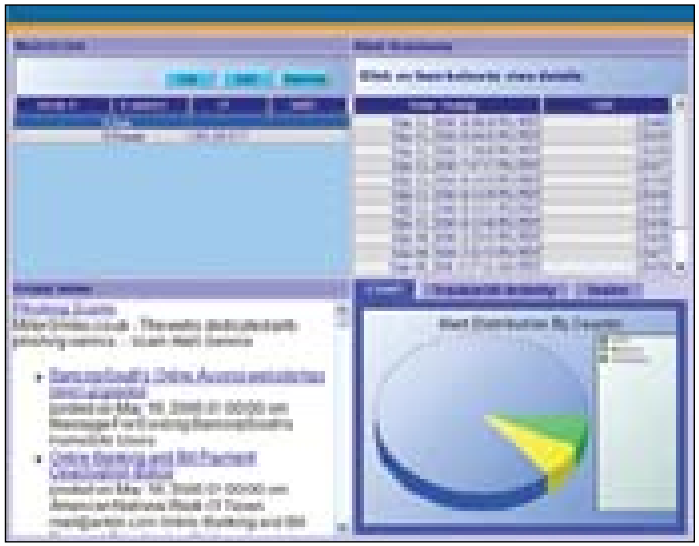
1. **Unstructured Investigative**– Provides a robust database of business information to analysts seeking information to support infrequent and non-recurring business questions (modeling, mining, visualization).

2. **Structured Investigative**– Delivers structured sets of information on-demand to end-consumers to provide answers to recurring business questions (reporting, monitoring, scorecards).

3. **Embedded**– Intelligently "pushes" information directly to end-consumers by continuously monitoring ongoing business performance against business objectives.



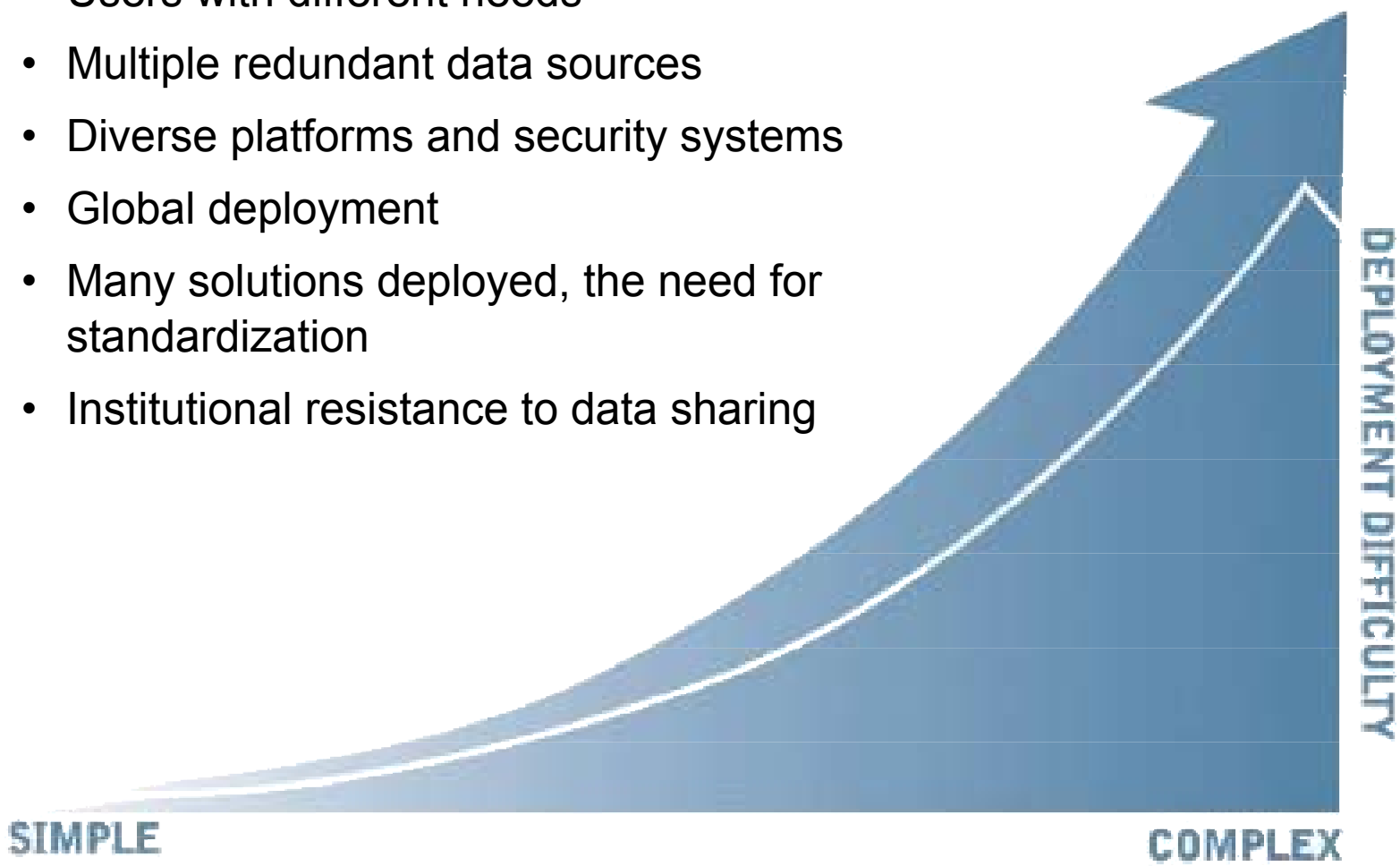




- Unified Gateway for enterprise-wide information (financial and non-financial)
- Self-service and personalized
- Causal drill-down capability
- Modular implementation based on re-usable objects
- Automated templates for budget development and collection
- Lights-out processing
- Links to market/competitor results
- Management alerts
- Role-based information

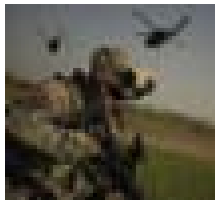
Key BI Challenges for Organizations

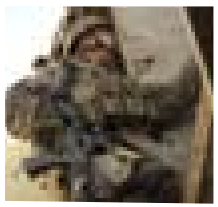
- Users with different needs
- Multiple redundant data sources
- Diverse platforms and security systems
- Global deployment
- Many solutions deployed, the need for standardization
- Institutional resistance to data sharing



- **Integrated** – Views of data across functional domains and their systems
- **Strategic** – Forecasting capabilities linked to the budgeting and planning processes
- **Improve productivity** – Activity Based Costing (ABC) and KPIs
- **Insight** – Flexible rollups and charting to view information in new ways
- **Performance** – Drive organizational performance to strategic objectives
- **Quality** – Consistent data definitions and standard metrics across the organization
- **Empowerment** – Provides for intelligent decision making at all levels of management

BI Methodology Overview



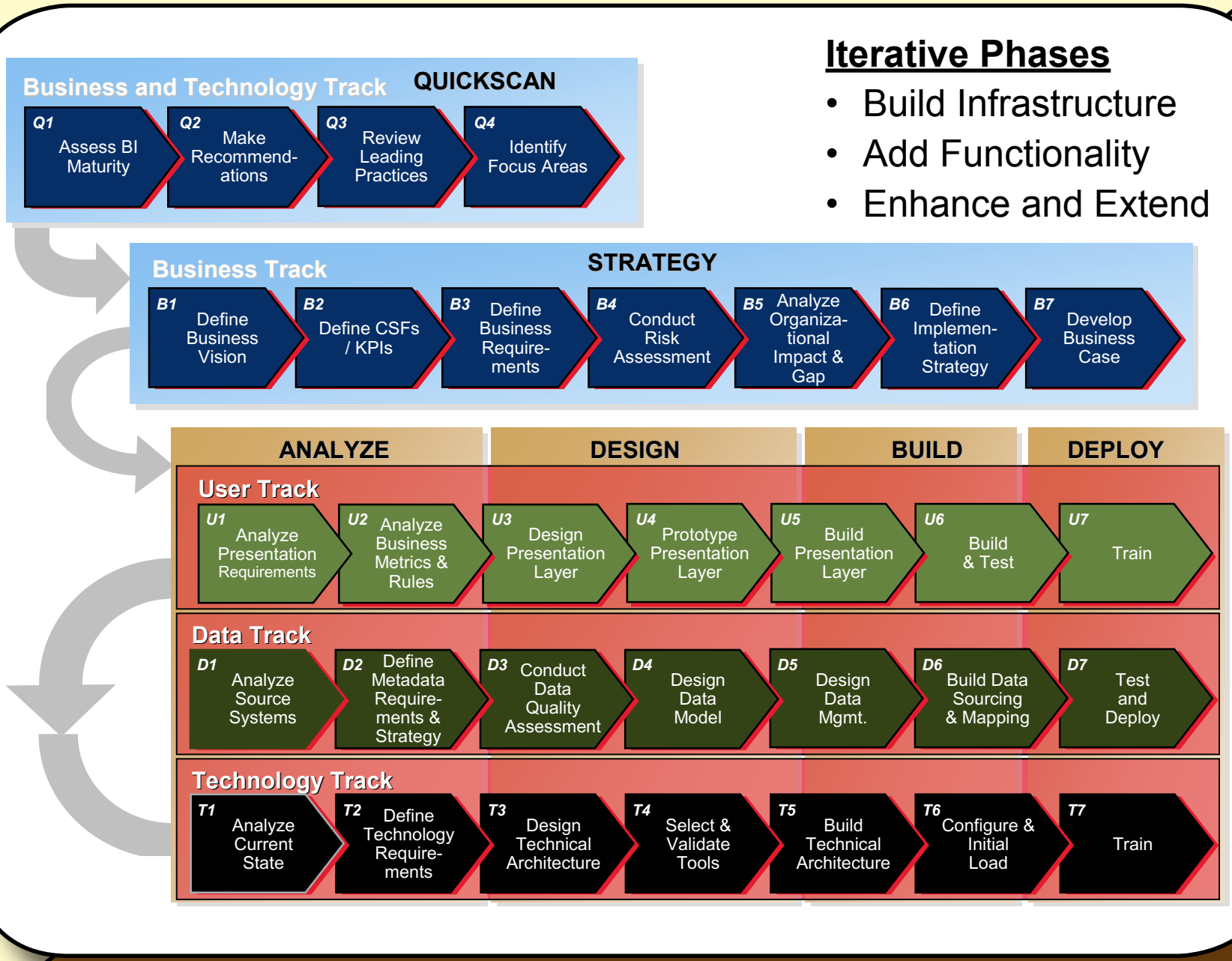


Take a long-term, strategic view of Business Intelligence, systems integration, and data management, but attack the problem with targeted, well-coordinated initiatives focused on delivering value rapidly.

Think Big – Develop a **BI roadmap** that supports your long-term objectives and ties in existing, related quick hits. This Roadmap is the compass that steers your systems integration and data management initiatives as you incrementally build the vision over time.

Start Small – Define and prioritize initiatives and carve out meaningful **phases** to deliver the highest value in the shortest amount of time. This builds ongoing support and momentum in the organization. A proof-of-concept can be effectively structured around one of the earlier phases to gain confidence and internal support.

Deliver Quickly – Develop and execute the roadmap with 90–120-day projects, grouped into phases of no longer than 6 months. This methodology allows you to incrementally build toward the vision while providing interim benefits to the business along the way.


Business and Technology Track
QUICKSCAN
Q1 Assess BI Maturity
Q2 Make Recommend-ations
Q3 Review Leading Practices
Q4 Identify Focus Areas
Iterative Phases
• Build Infrastructure
• Add Functionality
• Enhance and Extend
Business Track
STRATEGY
B1 Define Business Vision
B2 Define CSFs / KPIs
B3 Define Business Require-ments
B4 Conduct Risk Assessment
B5 Analyze Organiza-tional Impact & Gap
B6 Define Implemen-tation Strategy
B7 Develop Business Case
ANALYZE
DESIGN
BUILD
DEPLOY
User Track
U1 Analyze Presentation Requirements
U2 Analyze Business Metrics & Rules
U3 Design Presentation Layer
U4 Prototype Presentation Layer
U5 Build Presentation Layer
U6 Build & Test
U7 Train
Data Track
D1 Analyze Source Systems
D2 Define Metadata Require-ments & Strategy
D3 Conduct Data Quality Assessment
D4 Design Data Model
D5 Design Data Mgmt.
D6 Build Data Sourcing & Mapping
D7 Test and Deploy
Technology Track
T1 Analyze Current State
T2 Define Technology Require-ments
T3 Design Technical Architecture
T4 Select & Validate Tools
T5 Build Technical Architecture
T6 Configure & Initial Load
T7 Train

Business Intelligence Architecture

Business Intelligence is also a broad category of application programs and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions. BI applications include the activities of decision support, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining.

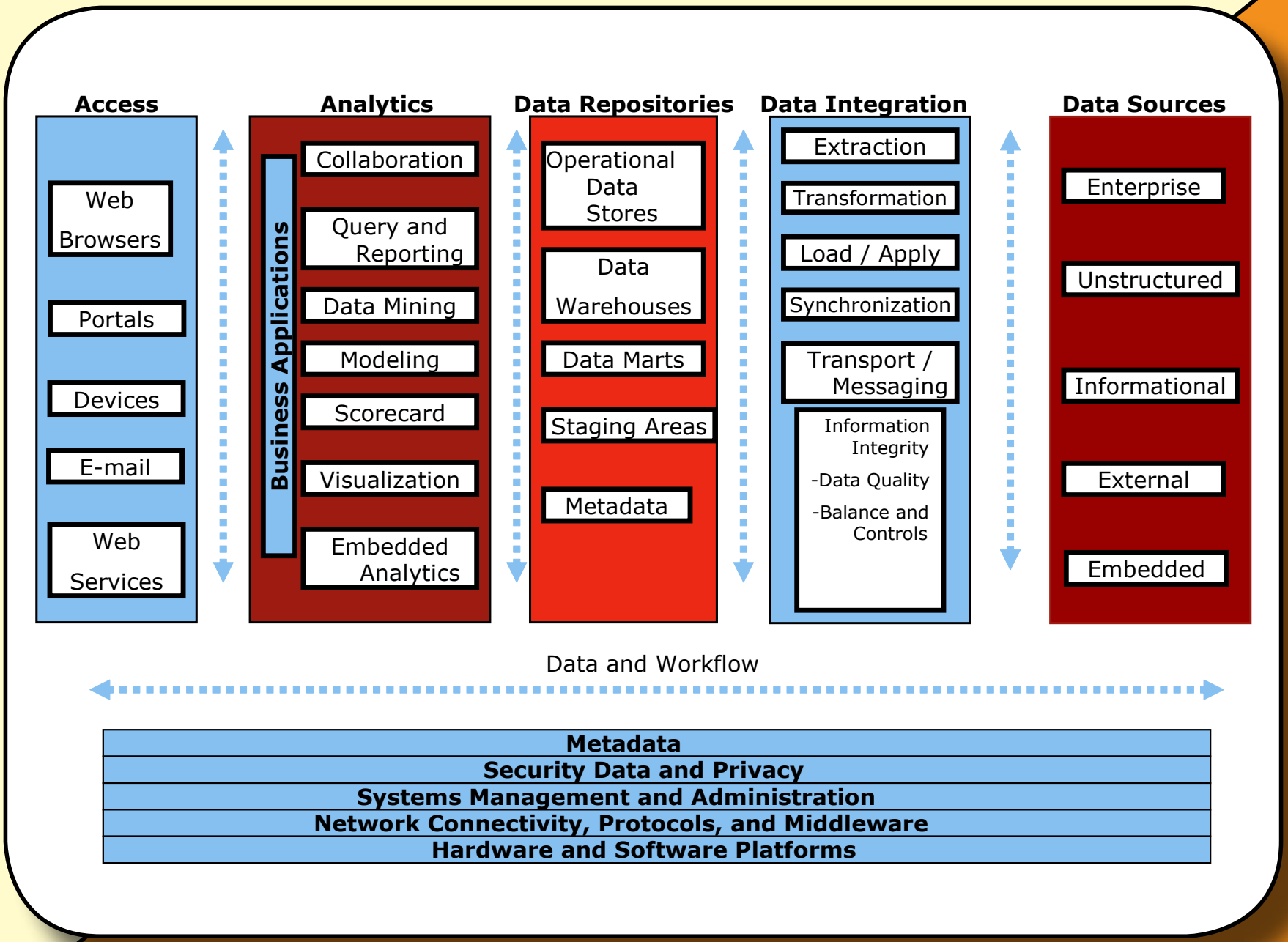
ESCC Key Concept

BI will assist Army enterprises in gaining better effectiveness and efficiency by providing access to data so that soldiers can make quality decisions backed by supporting data.

BI software leverages your investment in data and systems, providing easy-to-use information that improves decision making.

A modern BI architecture is based on open standards providing greater flexibility. Modern standards are defined today by their design and construction using Services Oriented Architecture (SOA) principles and modern Web services technologies.

Modern architectures separate applications from underlying infrastructure. It provides “loosely coupled” services, with clear separation between disparate application elements like data access and presentation.



Business Intelligence Architecture

Tools

Dashboards

- A quick, easy, visual summary of business conditions and metrics. They project the status of key performance indicators at a high level.

Reporting

- An aggregated view of business data that allows management to stay aware of performance in specific areas of their business. Types of reports could include operational, financial, and human resources.

Analytics

- Facilitates the manipulation of data in a very detailed and highly customized manner. This capability allows for the creation of ad-hoc queries, on-the-fly analysis, and data mining.

Metrics

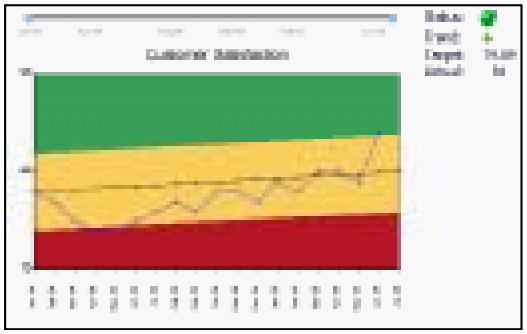
- Provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results.

Planning

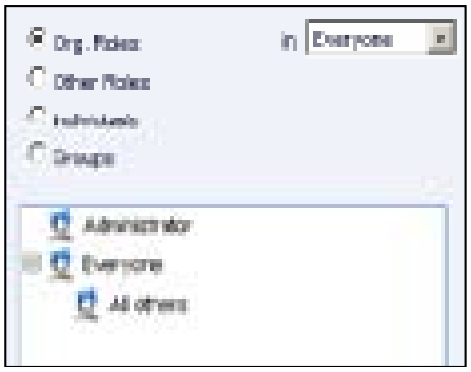
- Enables integrated operational and financial planning in real time, for immediate visibility into resource requirements and future business results.

Scorecards

Goals

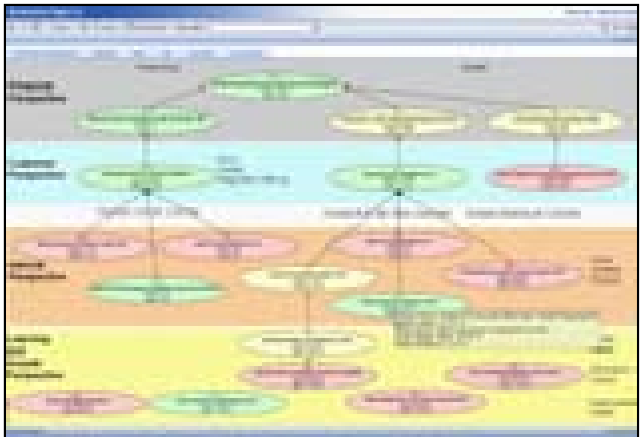


Roles



Discussion Threads

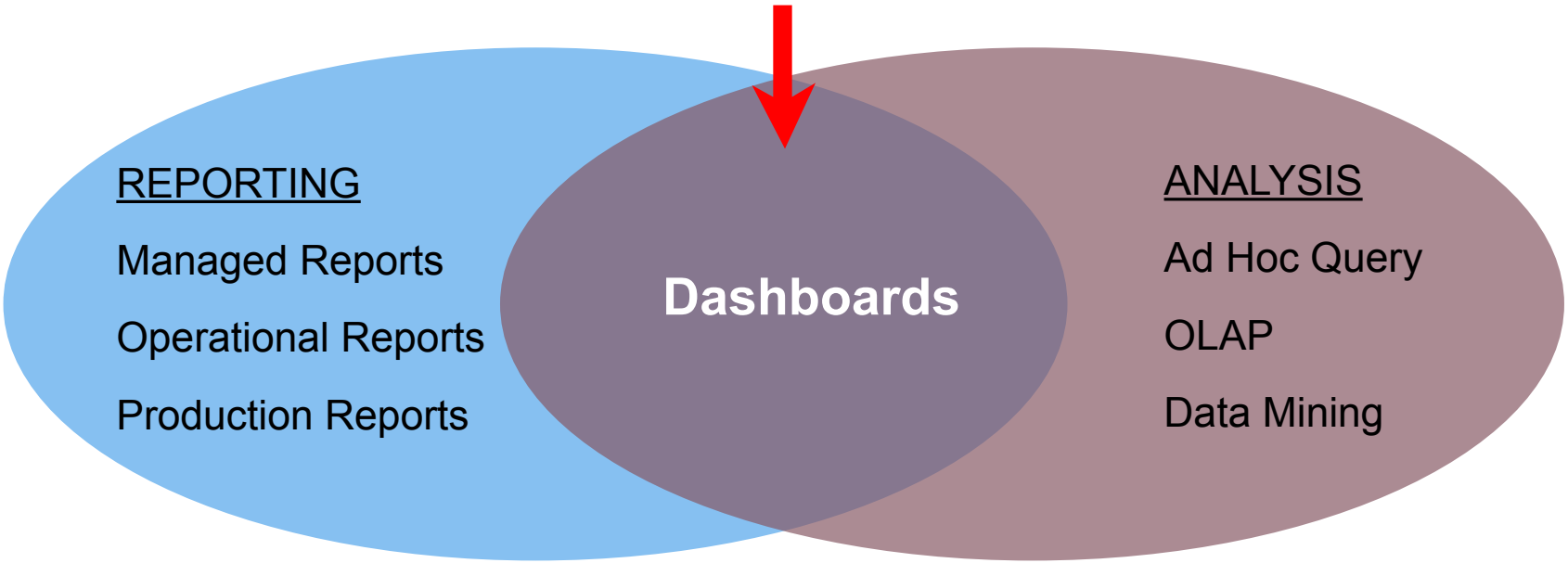
Strategy Maps



Recommended Actions

Tools – Dashboards

Business Intelligence "Sweet Spot"



Low Degree of Interactivity High

ESCC Key Concept

Dashboards deliver information from different sources in a single visual report so upper management can easily understand and monitor business performance.

What Does An Organization Need in a BI Tool?

Environment: Product that is open, flexible, and can leverage existing investments.

Coverage: Ability to meet the needs of all the users and applications with a *single* product.

Enterprise Class: Ability to scale reliably to thousands of users.

Where Do We Start?

As the business intelligence capabilities are identified, we realize that:

- A Business Intelligence program covers almost all business functions
- It touches a large proportion of business processes
- It interacts with data internally and externally – across all operational systems
- Merges recent data (sometimes real-time) with historical trends
- There are localized, functionally oriented capabilities (like budgeting) as well as cross-functional, cross-enterprise capabilities (like balanced scorecards)
- Capabilities are not static in nature but will change as the business environment changes over time

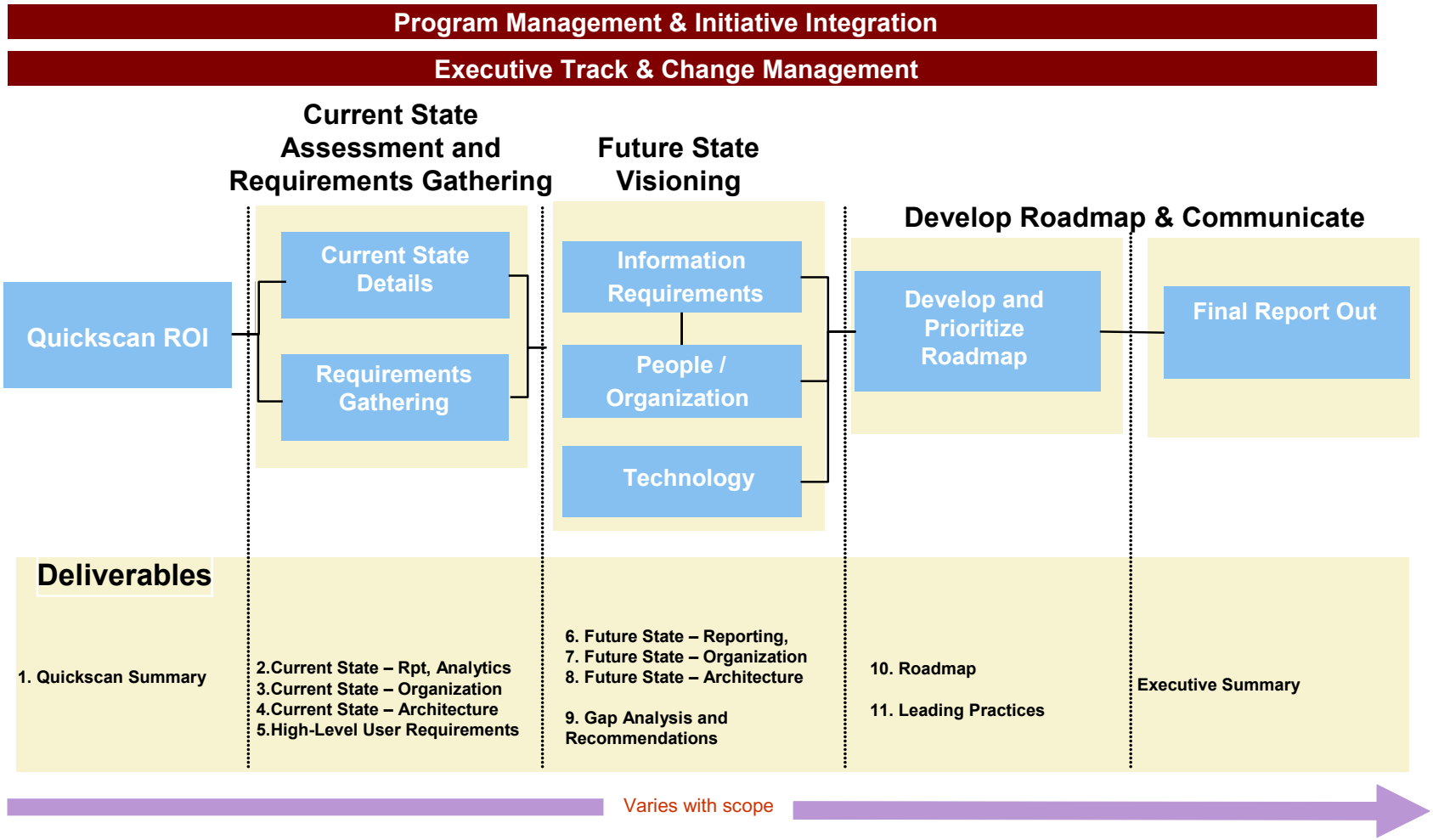
Key questions are:

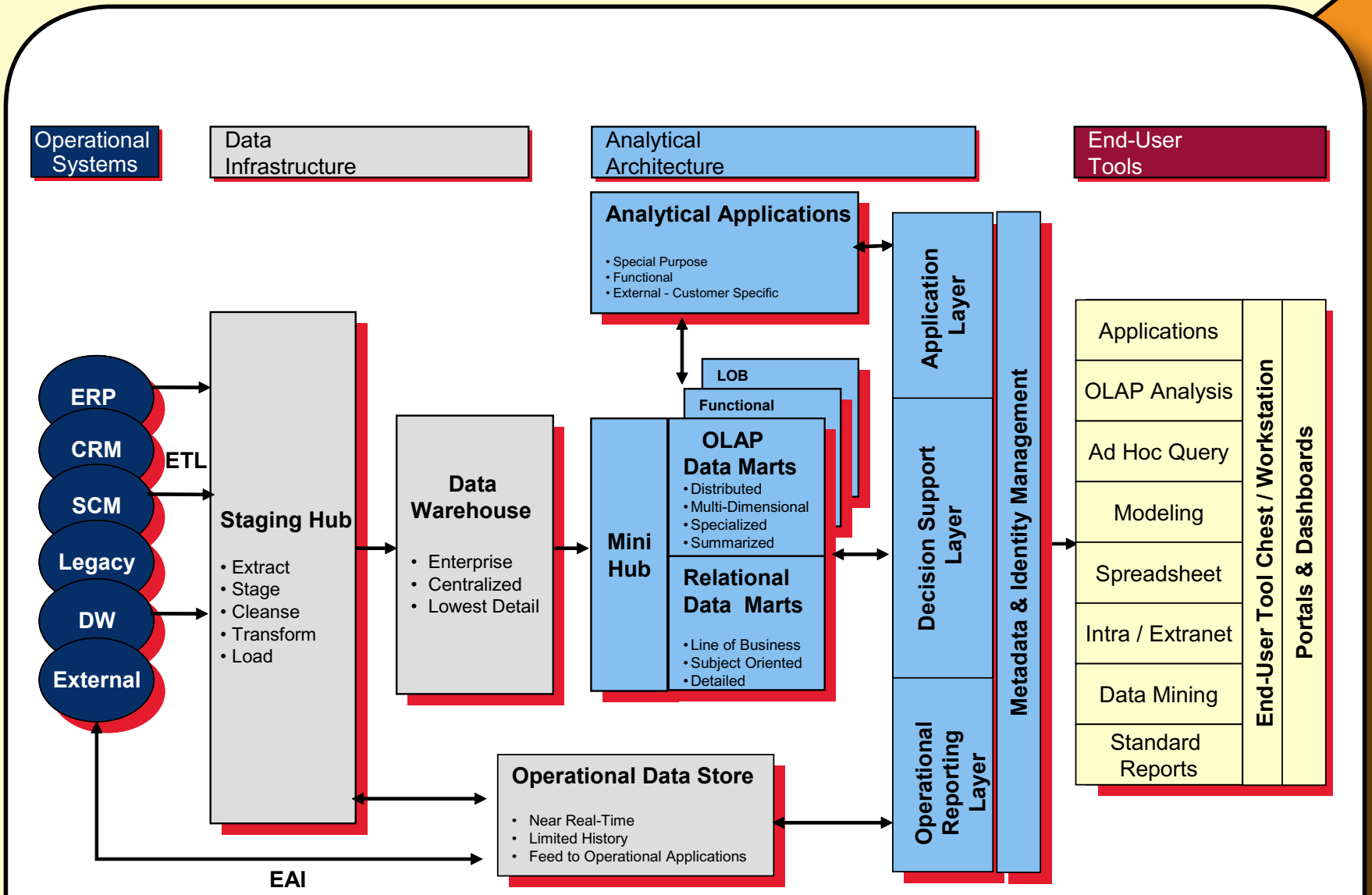
- How do we architect solutions to satisfy both real-time and trending aspects of data?
- What is the right technology footprint?
- How do we scale (volume and capability) as business expands? How do we adapt to change?
- How do we bridge existing gaps and work within business units and functional areas to create common capabilities?
- How do we manage change over time?
- How do we integrate knowledge across processes and applications?
- How do we measure value?
- What is the nature of governance and oversight we need?

There are 10 strategies that can help you plan and execute a business intelligence program.

- Strategy # 1 – Understanding and Managing Operational Data
- Strategy # 2 – Right Information Architecture
- Strategy # 3 – Information Assurance
- Strategy # 4 – Metadata Management
- Strategy # 5 – Information Security
- Strategy # 6 – Master Data Management
- Strategy # 7 – Demand Management
- Strategy # 8 – Organizing People
- Strategy # 9 – Enabling Change and Facilitating Adoption
- Strategy # 10 – Measuring Value

ROI Assessment




Operational Systems
Data Infrastructure
Analytical Architecture
End-User Tools
Analytical Applications
• Special Purpose
• Functional
• External - Customer Specific
ERP
CRM
SCM
Legacy
DW
External
ETL
Staging Hub
• Extract
• Stage
• Cleanse
• Transform
• Load
Data Warehouse
• Enterprise
• Centralized
• Lowest Detail
Mini Hub
LOB
Functional
OLAP Data Marts
• Distributed
• Multi-Dimensional
• Specialized
• Summarized
Relational Data Marts
• Line of Business
• Subject Oriented
• Detailed
Application Layer
Decision Support Layer
Operational Reporting Layer
Metadata & Identity Management
Applications
OLAP Analysis
Ad Hoc Query
Modeling
Spreadsheet
Intra / Extranet
Data Mining
Standard Reports
End-User Tool Chest / Workstation
Portals & Dashboards
Operational Data Store
• Near Real-Time
• Limited History
• Feed to Operational Applications
EAI

Top 10 Misconceptions

Myth: Business Intelligence is about delivering simple reports.

Fact: Business Intelligence is not just about delivering reports to a group of users; it provides an integrated and easily accessible means of interactive analysis and information sharing across the enterprise.

Myth: BI/Analytics is just a cost cutter.

Fact: BI/Analytics not only helps reduce costs, it improves decision-making ability, streamlines operations, provides timely data delivery, and assists the enterprise with meeting regulatory compliance.

Myth: I have all the information I need.

Fact: If your data is siloed, then it is likely you don't have the "full picture."

Myth: IT owns the data.

Fact: IT is the steward responsible for the systems that capture and store the data. Business users own and utilize the data to make their decisions.

Myth: All BI solutions are the same.

Fact: BI solutions must use industry-specific data models, data definitions, and business rules.

Myth: BI implementation costs are too high for my organization.

Fact: The cost of bad decisions will impact your organization much more than the cost of implementation.

Top 10 Misconceptions

Myth: I already have an ERP or CRM so I don't need a BI solution.

Fact: Many enterprises have a lot invested in their ERP/CRM systems but have not seen the big returns they might have been expecting. BI is a way to, with a small additional investment, realize additional benefits out of those systems.

Myth: I have always made gut business decisions and they have worked well for me.

Fact: Often, evaluating opportunities are too expensive and time consuming, but having a BI solution allows you to quickly evaluate, justify, or disprove those decisions.

Myth: I can't get a defined BI return-on-investment (ROI).

Fact: There are clearly values and benefits from implementing a BI solution but an enterprise needs to focus on: "What is the business value?" and "How is this helping to drive the business?" The main benefits gained through BI are the intangible benefits of strategic value such as "faster reporting, better management information, better decision making, improved visibility and accountability, and more productive users."

Myth: Implementing a BI solution will automatically transform my business processes.

Fact: Many organizations do not understand their business processes well enough to determine how to improve them. Army business leaders must understand all activities that make up a particular business process before the BI project begins in order to efficiently and effectively transform their business processes which then improves how individuals and the organization perform.

Reasons for Success

The enterprise has adopted the view that data is a corporate asset and initiated a combination, or all, of these data management programs:

Business Information Governance Programs
Governs standards and corporate requirements for data management.

Enterprise Information Strategy
Corporate-level strategy to organize, structure, and leverage information assets.

Information Quality Program
Procedure to identify, fix, and prevent data quality problems; inaccuracy and incompleteness.

Enterprise Data Warehouse
Central repository of enterprise data for reporting and analytical purposes.

BI Competency Center
Core team to manage BI efforts across the enterprise.

- Lack of user adoption.
- Incomplete or inaccurate business requirements.
- Disconnect between BI and performance management in the organization.
- Lack of cooperation or collaboration between business and IT.
- Lack of required business skills within the organization.
- Insufficient funding to do it right.
- Lack of required IT skills within the organization.

Reasons for Failure — Flaws

Reasons for Failure — Assumptions

"If we build it, they will come."

A successful initiative combines business relevance with strong architecture.

Pose the questions: "Is the data garnered appropriate for business users? Is it correct and precise? Are answers and insights available when needed?"

Use the ESCC to drive adoption of BI into business, as well as to gather the business, technology, and communication skills required for successful BI initiatives.

“Managers need to negotiate the numbers.”

Use regulations such as Sarbannes Oxley to educate business users about risks posed by widespread use of spreadsheets, proliferating data silos, and unclear ownership of performance data.

Remind users that “multiple versions of the truth” could open up the organization to charges of data manipulation, information hoarding, and data filtering.

Forbid the use of spreadsheets for formal reporting and management meetings.

Reasons for Failure — Assumptions

"Our business application vendor will deliver the best solution."

Promote an understanding of what functions aren't delivered by ERP systems. Compare the functions included in the enterprise application's BI tools with tools offered by the leading vendors in the BI market.

"There's no need for BI applications to evolve."

Army managers and IT staff should work together to stamp out redundant BI tools. Stop the proliferation of new tools by enforcing standardization for tools before they are deployed.

Define a review/feedback process for ensuring that the BI strategy, investments, and skills stay aligned with the overall vision and architecture, as well as business needs.

“We can outsource the whole thing.”

Remember the “golden rule” of outsourcing: Outsource only those things that are not a core competency or core business. Business strategy formulation and feedback on its results must be a core competency.

“Just give me a dashboard.”

If you have already implemented a solid data warehouse infrastructure, then a performance dashboard or complex scorecard is easier to create.

Ensure that management uses a strategy map in conjunction with its scorecard or dashboard. A strategy map is a cause-and-effect diagram between the objectives or performance indicators at a more detailed level in a scorecard. If such mapping isn’t completed, the scorecard offers little more than a collection of unrelated metrics.

Critical Success Factors

CSF # 1: High-level executive, financial, and IT involvement

Successful projects require GO/SES involvement to provide support for the BI implementation.

ESCC Key Concept

Management must be willing to fully commit and support the BI transformation.

CSF #2: Engaged end users

End users need to become engaged in the project since they will become the main users of the system and are able to provide information on their current and future needs.

ESCC Key Concept

Always remember the sole purpose of BI is to aid the end user.

CSF #3: Business and IT alignment

IT must support the needs of the business while the business must provide support for the needed IT projects that will enable the enterprise to become more efficient and effective.

ESCC Key Concept

Although BI serves a business purpose, technology is its backbone.

CSF #4: Pervasive appreciation for value of data throughout the enterprise

All users must understand and appreciate the value of precise up-to-date data and its effects on the enterprise. Having a higher appreciation will result in greater likelihood of a successful BI implementation.

ESCC Key Concept

Recognizing the importance of data and making this pervasive throughout the organization is important to a successful BI implementation.

CSF #5: Five key BI best practices, including enterprise-wide data quality and strategy

- Implement the five key BI proven practices to ensure a greater likelihood of BI implementation success.
    1. Business Information Governance Programs
    2. Enterprise Information Strategy
    3. Information Quality Program
    4. Enterprise Data Warehouse
    5. BI Competency Center (ESCC)

- Ensure data entering into the BI system is “high quality” and “clean” to have data output that is correct and relevant to the business.

ESCC Key Concept

Creating a BI implementation strategy plan that incorporates the five key BI proven practices *before* the start of the project greatly increases the probability of success.

CSF #6: A Competency Center is core to BI success. Its role is to "champion the BI technologies and define standards. It focuses on business alignment, project prioritization, and resolving management and skills issues associated with significant BI projects."

It is necessary to have a Competency Center to continue the development and maintenance of the BI system. The Competency Center will also help make the BI system pervasive throughout the organization.

ESCC Key Concept

The ESCC will help ensure that you are able to achieve full return on investment on your BI implementation.

CSF #7: Have a continuous improvement mentality in order to realize and achieve the full business value of having a BI solution.

Implementing a BI solution is only the beginning of a process to have it become pervasive throughout the organization. This will ensure that the full business value will be achieved by allowing all management employees access to the system.

ESCC Key Concept

Having a continuous improvement mentality is necessary in making BI pervasive throughout the enterprise.

- Understand the growing importance of training in making BI and analytics initiatives successful.
- Acknowledge that integrating data should be given a high priority by management, not just IT.
- Anticipate that enterprise data is in much worse shape than executives probably imagine.
- Forge closer links among finance, IT, and business groups.
- Deploy quickly then adjust as you proceed. Don't spend a large amount of time developing the "perfect" report since needs will evolve as the business evolves. Deliver reports that provide the most value quickly, then tweak them.
- Don't buy BI because "you think you need it". Deploy BI with the idea that there are numbers out there that you need to find, and know roughly where they might be.
- Define ROI clearly before the project begins. Outline the specific benefits you expect to achieve, then perform a reality check every quarter or six months.

Definitions

Business Intelligence – The process of gathering meaningful information that provides positive impact on business. BI has a broad range of application programs and technologies for gathering, storing, analyzing, and providing access to data.

Data – The computerized representation of business information

Metadata – Data about data. Essentially, information about the data collected. For example, the data might be a list of phone numbers, but that would not be clear unless the metadata described the information as "phone numbers".

Information – A representation of the business data understood and used by end users.

Data Warehousing – Where raw data is stored and can be "mined" (see Data Mining).

Data Mining – Extraction of information from a database that allows the data to be looked at from various perspectives and summarized into useful information.

Key Performance Indicators – Metrics used to define and measure the status of objectives that reflect the performance of an organization. These are often unique to each company and are agreed to as a way to gauge difficult-to-quantify goals.

Actuate
- www.actuate.com

Business Objects
- www.businessobjects.com

Hyperion (Oracle)
- www.hyperion.com

Cognos
- www.cognos.com

Microsoft
- http://www.microsoft.com/sql/solutions/bi/default.mspx

MicroStrategy
- www.microstrategy.com

Oracle BI
- http://www.oracle.com/technology/products/bi/index.html

SAS
- www.sas.com

Useful Websites – BI Vendors

Useful Websites

BI Information

TDWI - The Data Warehousing Institute
- http://www.tdwi.org

BI Solutions
- http://www.all-bi.com/

BI Knowledge Base
- http://businessintelligence.ittoolbox.com/

Examples of BI Dashboards
- http://dashboardspy.com/

BI Portal
- http://www.dmreview.com/portals/portal.cfm?topicId=230064

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